
Space Weather Forecast

Issued on Wednesday, 20 March 2024 at 12:50 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: Moderate flares likely (R1-R2 Radio blackouts), slight chance of strong flares (R3 blackouts). Chance of G1 from Coronal Mass Ejection arrivals mainly late Day 1 (20 Mar).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity has been Moderate, with the largest flare peaking at 20/0736 UTC from the largest region in the southeast. This is one of the main regions of interest on the disc and has a large number of smaller spots, showing a couple of areas of magnetic complexity. The other region of most interest is in the northeast (likely a region from the previous rotation which gave three Strong flares, including the largest of the solar cycle so far) which has a large main spot with clear magnetic complexity. One region in the southwest has seen some growth of intermediate spots recently. A new spot region is appearing around the southeastern limb and its analysis will be re-assessed as it becomes more clearly visible. The remaining regions currently appear stable or showing slight decay.

No Earth directed Coronal Mass Ejections (CMEs) have been observed in the last 24 hours.

Solar Wind / Geomagnetic Activity: Solar winds were at ambient to slightly elevated levels through the period. Wind speeds were between 340-400 km/s. Interplanetary Magnetic Field was weak throughout. The north-south component varied weakly. Geomagnetic activity was Quiet (Kp1-2).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is now close to background levels following the S1 enhancement on 15-16 Mar.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity is likely with a slight chance of becoming High with any isolated Strong flares, mostly due to the two regions in the east, but other regions in the west bear keeping an eye on.

Solar Wind / Geomagnetic Activity: A complex eruption on 17 Mar saw two possible Earth-directed CMEs. The arrivals of these are expected during Day 1 (20 Mar) or into early Day 2 (21 Mar), perhaps arriving as two separate shocks but may also arrive together. The more likely impact is from the slower of the two CMEs, but perhaps also a glancing blow from the slightly faster and further south CME. Ongoing effects are possible during Day 2 (21 Mar), before then easing. Aside from the CMEs, no other sources of notable enhancement to solar winds are forecast.

Geomagnetic activity is expected to be Quiet to Unsettled (Kp1-3), with a chance of Active or G1/Minor Storm and a slight chance of G2/Moderate Storm conditions (Kp4-6) Day 1 into Day 2 from the CME. Effects are then likely to decline through Day 2, becoming largely Quiet by Day 3 (22 Mar) in the absence of further CMEs.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to remain around background levels, with a slight chance of further enhancements. This risk increases slightly through the period.

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	50	40	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	Yes	60	60	60	60
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	5	5	10	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm⁻²sr⁻¹s⁻¹)